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Filed : June 24, 2003

REMARKS

Claims 1, 3-11, and 13-19 are pending in this application. Claims 1, 3-5, 13-15, 17, and 19 have been amended. Claims 2, 12, and 20 have been canceled. Support for the amendments is found in the specification and claims as filed.

Claim Objection

Claim 15 has been objected to because of informalities. Claim 15 has been amended to delete the second occurrence of the term “polyarylsulfone.” In view of the foregoing amendment, Applicants respectfully request withdrawal of the objection.

Claim Rejection - 35 U.S.C. § 112, second paragraph

Claim 17 has been rejected as indefinite for use of the trademark/trade name Mylar. Claim 17 has been amended to delete the term “Mylar.” Applicants note that Claim 17 recites “polyester,” and that Mylar is a type of polyester film. In view of the foregoing amendment, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 102(b)

Claims 1-4 and 15-20 have been rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 4,873,037 (hereinafter “Chau *et al.*”). “A rejection for anticipation under section 102 requires that each and every limitation of the claimed invention be disclosed in a single prior art reference.” *See, e.g., In re Paulsen*, 31 U.S.P.Q.2d 1671 (Fed. Cir. 1994). Chau *et al.* does not disclose every element of Applicants’ claims, and therefore cannot be considered as an anticipating reference under 35 U.S.C. § 102(b).

Pending independent Claim 1 as amended recites a filter laminate comprising, *inter alia*, “a first membrane layer comprising a first membrane, wherein said first membrane is a microporous or ultraporous asymmetric membrane; at least a second membrane layer comprising a second membrane; and a bonding layer, wherein said bonding layer is a hot melt adhesive heat-bonded to said first membrane layer and to said second membrane layer.” Pending independent Claim 19 as amended recites a filter laminate comprising, *inter alia*, “a first distinct preformed layer of material, said first distinct preformed layer comprising a first membrane layer, said first

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membrane layer comprising a microporous or ultraporous asymmetric membrane; a second distinct preformed layer of material, said second distinct preformed layer comprising a second porous membrane layer; and a third distinct preformed layer of material, said third distinct preformed layer comprising a third membrane layer; wherein each layer is adjacent to at least one other layer, wherein adjacent layers are secured by a bond, and wherein the bond is formed by a hot melt adhesive heat-bonded to said adjacent layers."

Chau *et al.* discloses a microporous membrane with a separation layer formed thereon. The membrane can be formed by a multi-step process. In the first step of the first process, different polymers are coextruded to form a lamellar composition wherein each of the layers in the lamellar composition comprises at least two different polymeric materials, one of which has a preferential solubility in an extraction medium. In the second step, the lamellar composition is comminuted then remelted and recoextruded to form a second laminate, or the lamellar composition is mixed then extruded in a continuous process. In the third step, the second laminate is contacted with an extraction medium that preferentially removes one of the polymers in the second laminate, thereby forming pores in the second laminate to yield as a support a membrane having a microporous structure. See col. 1, lines 35-53 and col. 2, lines 25-31. The support is characterized by a narrow pore size distribution (col. 9, lines 44-48), and thus is not an asymmetric membrane. A separation layer is then applied to the support. The separation layer is in the form of a "dense continuous layer having a minimum of flaws" (col. 11, lines 16-17). In order to separate dense gases and dense liquids, the separation layer must be nonporous but selectively permeable to the gas(es) and/or liquid(s) of interest. The separation layer is applied to the supporting layer to yield what Chau *et al.* refer to as an "asymmetric membrane," which is actually a composite of two different membrane layers, one an isotropic microporous support layer, and the other a nonporous separation layer. Chau *et al.* does not teach that the individual membrane layers comprising the composite are themselves asymmetric. Chau *et al.* also does not disclose laminates comprising hot melt adhesives.

Accordingly, Chau *et al.* does not disclose a filter laminate comprising a microporous or ultraporous asymmetric membrane. Chau *et al.* also does not disclose a filter laminate wherein layers of the laminate are heat-bonded to each other by a hot melt adhesive. Chau *et al.* therefore

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cannot anticipate pending independent Claims 1 and 19, and Applicants respectfully request that the anticipation rejection be withdrawn.

Claim Rejection - 35 U.S.C. §103(a)

Claims 5-11 have been rejected under 35 U.S.C. §103(a) as obvious over Chau *et al.* in view of US 5,006,247 (“Dennison *et al.*”). As discussed above in regard to the section 102 rejection, Chau *et al.* does not disclose a filter laminate comprising a microporous or ultraporous asymmetric membrane, or a filter laminate wherein layers of the laminate are heat-bonded to each other by a hot melt adhesive. Dennison *et al.* is cited as disclosing microporous or ultraporous asymmetric membranes, and it is asserted that it would have been obvious to substitute the Dennison *et al.* asymmetric porous membrane as the porous membrane in Chau *et al.* in order to make the filter useful in microfiltration or ultrafiltration.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As discussed below, there is no teaching, suggestion, or motivation to combine Dennison *et al.* with Chau *et al.* to yield the invention as claimed in independent Claim 1, from which pending Claims 5-11 depend.

The Chau *et al.* laminates are used for gas and liquid separations, and not for microfiltration or ultrafiltration (i.e., filtration of solid particles from a liquid). If the asymmetric layer of Dennison *et al.* were substituted for the separation layer of Chau *et al.*, then the membrane would no longer be capable of use in gas and liquid separations. If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Moreover, if the asymmetric layer of Dennison *et al.* were substituted for the support layer of Chau *et al.*, then the benefits of the Chau *et al.* support would be lost, *i.e.*, a narrow pore size distribution coupled with a small pore size. The mere fact that references can be combined

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or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

To articulate a *prima facie* case of obviousness under 35 U.S.C. §103(a), the PTO must, *inter alia*, cite prior art that teaches or suggests all the claimed limitations. *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974). It is noted that Dennison *et al.* discloses asymmetric membranes which can be cast onto a porous support. Methods of preparing composite membranes by casting or forming one membrane layer *in situ* directly on top of another membrane layer are discussed in the present application on page 2 at lines 9-23. As discussed in the present application, one of the disadvantages of such processes is that the fibers of the support layer can penetrate into the adjacent membrane zone. Such penetration by the support layer can adversely affect the separations properties of the adjacent membrane. Applicants avoid this potential problem by using a bond or bonding layer comprising a hot melt adhesive between the membrane layers, which is not disclosed in Dennison *et al.*

Accordingly, the invention as claimed in pending Claims 5-11 are nonobvious over Chau *et al.* in view of Dennison *et al.*, and Applicants respectfully request that the rejection be withdrawn.

Claim Rejection - 35 U.S.C. §103(a)

Claims 12-14 have been rejected under 35 U.S.C. §103(a) as obvious over Chau *et al.* in view of US 5,547,575 (“Demmer *et al.*”). As discussed above in regard to the section 102 rejection, Chau *et al.* does not disclose a filter laminate comprising a microporous or ultraporous asymmetric membrane, or a filter laminate wherein layers of the laminate are heat-bonded to each other by a hot melt adhesive. Demmer *et al.* is cited as disclosing a porous membrane for a microfilter comprising hot melt adhesive for bonding membrane layers together. To articulate a *prima facie* case of obviousness under 35 U.S.C. §103(a), the PTO must, *inter alia*, cite prior art that teaches or suggests all the claimed limitations. *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974). Contrary to the assertion in the office action, Demmer does not disclose “a hot melt adhesive heat-bonded to said first membrane layer and to said second membrane layer” as recited in pending Claim 1, from which pending Claims 13 and 14 depend (Claim 12 has been canceled).

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Demmer *et al.* discloses asymmetric membranes that are surface coated so as to modify the surface properties of the membrane. Demmer *et al.* discloses applying a second polymer to a formed membrane comprising a first polymer. The second polymer can include “not only those polyamides which are customarily used as materials of construction, but also those which are used for other purposes such as the polyamide resins and polyamide-based hot melt adhesives,” and these polyamides are described as having “an especially high grafting tendency,” *i.e.*, grafting by free radical chain polymerization. See col. 6, lines 29-37. It is also taught that “the second polymer must not be used as such for coating the surface of the formed body. A preferred embodiment of the invention utilizes precursors of the second polymer to react on the surface of the formed body upon polymerization.” See col. 4, lines 20-24. Demmer *et al.* teaches that the second polymer is halogenated and then reacted with a reactive monomer in a grafting reaction that modifies the surface properties of the membrane. See col. 7, line 62 through col. 10, line 15.

The precursors of the second polymer of Demmer *et al.* are incapable of functioning as hot melt adhesive that can form a heat-bond, and the resulting second polymer does not function as a hot melt adhesive that can form a heat-bond – their mechanism of action is graft polymerization. In contrast, Applicants filter laminate as recited in Claim 1 includes “a hot melt adhesive heat-bonded to said first membrane layer and to said second membrane layer.” If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

Furthermore, Demmer *et al.* only discloses a single membrane that is subjected to surface modification by a polymer recognized as used for other purposes, *i.e.*, as hot melt adhesives - not a hot melt adhesive used as such in the surface modification method taught by Demmer *et al.* There is no teaching or suggestion in Demmer *et al.* as to forming a bond between adjacent porous membrane layers, much less forming a bond between adjacent porous membrane layers by a hot melt adhesive. Accordingly, Claims 13 and 14 are nonobvious over Chau *et al.* in view of Demmer *et al.*, and Applicants respectfully request that the rejection be withdrawn.

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Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns that might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number below.

Respectfully submitted,

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